KOREAN CUISINE

Hongeotang

Skate Soup | 홍어탕



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Hongeotang is an extreme biochemical soup that leverages the unique osmoregulatory system of cartilaginous fish (Chondrichthyes). To survive in saltwater, skates store high concentrations of urea in their tissues. When aged skate is submerged in a 100°C boiling solvent, this internal urea rapidly converts into ammonia gas, unleashing a piercing, highly alkaline aerosol that aggressively stimulates the olfactory nerves and nasal mucosa. Simultaneously, prolonged thermodynamic heating causes the skate's cartilaginous skeleton—rich in chondroitin sulfate and collagen—to undergo thermal hydrolysis. The rigid cartilage collapses into a sticky, chewable gelatinous matrix, creating an unparalleled textural experience. To biochemically buffer the harsh sting of the ammonia, fermented soybean peptides (Doenjang) and fiery capsaicin are integrated into the broth. In the final moments, water dropwort (Minari) is added, deploying its high potassium content and volatile terpenes to slice cleanly through the intense alkalinity with a refreshing crunch.

⏱️ **Total:** 40 mins | **Prep:** 10 mins | **Cook:** 30 mins | 🍳 **Difficulty:** Extreme (Requires alkaline volatilization control and cartilage hydrolysis) | 🌶️ **Profile:** Piercingly Pungent, Spicy, and Deeply Savory | 🍚 **Focus:** Ammonia Volatilization, Chondroitin Gelatinization, & Acid-Base Buffering | 🍶 **Pairing:** Tart, lactic acid-rich unpasteurized Saeng-Makgeolli (Acid-Base Neutralization)

Ingredients (2–3 servings)

- **Urea & Chondroitin Matrix:** 400g Aged Skate (Hongeo - chopped into large chunks, including the cartilage and wings)
- **Pectin & Turgor Matrix:** 150g Daikon Radish (sliced into squares), 2 handfuls Water Dropwort (Minari - cut to 5cm lengths), 1/2 Onion, 1 stalk Green Onion
- **Aqueous Umami Solvent:** 1L Anchovy-Kelp Broth
- **Hypertonic Alkaline Buffer:** 1.5 tbsp Doenjang (Korean soybean paste), 2.5 tbsp Gochugaru (chili flakes), 1 tbsp Soup Soy Sauce, 1.5 tbsp minced garlic, 0.5 tsp minced ginger

Allergy Information Contains: Cartilaginous Fish (Skate), Soy, Wheat (from Doenjang and soy sauce)

Equipment High Thermal Mass Pot (Jeongol-naembi), Cutting Board, Knife (Ensure the kitchen is heavily ventilated during cooking)

Cooking Instructions

1. **Solvent & Pectin Hydrolysis:** Place the sliced radish and cold anchovy broth into a pot and heat over a high flame. As the temperature rises, the

tough cellular walls of the radish break down, releasing cooling reducing sugars into the broth.

2. **Buffer Emulsion Addition:** Once boiling, dissolve the Doenjang into the solvent. The fermented amino acids from the soy will act as a crucial chemical buffer against the skate's sharp ammonia. Mix in the Gochugaru, soy sauce, garlic, and ginger to establish the hypertonic, spicy base.
3. **Alkaline Volatilization & Hydrolysis:** Drop the chunks of aged skate into the rolling boil. The instant the 100°C convective heat strikes the flesh, the urea explosively evaporates into ammonia gas, filling the kitchen with a sharp, stinging aroma. Boil uncovered over medium heat for 15–20 minutes. Leaving the lid off is mandatory to allow the excess volatile ammonia to escape, while the thermodynamic heat slowly hydrolyzes the tough cartilage into a chewy, gelatinous state.
4. **Aromatic Terpene Finish:** Once the cartilage turns translucent and soft enough to chew, turn off the heat. Heap the Minari and green onions over the top, allowing the massive radiant heat to gently wilt them. The refreshing herbaceous terpenes perfectly contrast the heavy alkaline broth.
5. **Serve:** Serve blistering hot, embracing the extreme vaporized heat and the viscoelastic texture of the melted cartilage.

💡 Professional Culinary Tips

- **Chemistry of Ammonia Conversion:** Skates retain urea in their flesh for osmotic balance in the ocean. Through aging, urease enzymes convert this urea into ammonia. When boiled, this chemical reaction and volatilization accelerate exponentially. If you boil this soup with the lid closed, the ammonia gas becomes trapped and dissolves back into the liquid, rendering the soup unbearably bitter and foul. Simmering uncovered is a strict physical necessity.
- **Physics of Cartilage Gelatinization:** Unlike teleost (bony) fish, the skate’s skeleton is made entirely of cartilage (chondroitin and collagen). Subjecting it to prolonged kinetic heat melts these tough structures. The broth becomes highly viscous, and the bones themselves transform into a crunchy, gelatinous delight that is meant to be chewed and swallowed entirely.
- **Masking Effect of Soy Peptides:** While a clear broth version exists, integrating Doenjang and chili flakes is a masterful biochemical stroke. The complex, earthy amino acids of the fermented soybean paste round off the jagged, offensive edges of the ammonia, transforming a potentially repulsive chemical sting into a highly addictive gastronomic thrill.

🍶 Gastronomic Pairing

- **Acid-Base Neutralization:** When the piercing, alkaline ammonia of the skate aggressively stimulates your nasal cavity and paralyzes your palate, pair this extreme dish with a chilled bowl of **unpasteurized Makgeolli (Korean Rice Wine)**. Known traditionally as "Hong-tak" (Hongeo + Takju), this pairing is pure chemistry. The rich lactic acid in the fermented Makgeolli chemically reacts with the alkaline ammonia on your tongue, neutralizing it into harmless

salt and water, instantly transforming the sharp pain into a smooth, savory reset.

Nutrition Facts (Estimated)

Total Content : Approx. 550g (1 serving)
Calories : 240 kcal (Excluding rice)
– Sodium : 1,150mg (Variable depending on Doenjang and soy sauce)
– Total Carbohydrate : 12.0g (Polysaccharides from radish and Minari)
– Sugar : 3.0g
– Total Fat : 2.5g (Ultra-low fat fish)
– Saturated Fat : 0.5g
– Cholesterol : 70.0mg
– Protein : 38.0g (Dense with bioavailable collagen and chondroitin peptides)
– Dietary Fiber : 4.5g

*Daily Values are based on a 2,000 calorie diet and standard Korean nutritional reference values.
**Nutritional values are calculated based on original ingredients; substitutions may alter specific macronutrients.

Origins and Food Culture of Skate Soup (Hongeotang)

1. The Maritime Corridor: Heuksan Island, Yeongsanpo Port, and the *Jasanoebo*

- Grounded in the turbulent history of the late Goryeo Dynasty (14th century), when coastal residents of Heuksan Island fled inland up the Yeongsan River toward Yeongsanpo Port in Naju to escape marauding Japanese pirates (*Wae-gu*).
- While ordinary fish caught during the fortnight-long river voyage rotted and caused severe food poisoning, skate—owing to its natural high-urea content and ammonia-producing preservation biochemistry—naturally matured into an edible, pungent delicacy without spoiling, leading to an ancestral culinary revelation.
- Historically documented in Jeong Yak-jeon's landmark 1814 marine encyclopedia *Jasanoebo*, which records the skate as *Buneo* (攩魚), noting that *"it effectively cures abdominal obstructions (chronic indigestion), dispels*

alcohol toxicity, and purifies the viscera," confirming centuries of medicinal culinary heritage.

2. The Culinary Lore of "Hong-eo-ae" and the Spring Barley Shoot Tradition

- Revered across the southwestern Jeolla coast (Mokpo, Sinan, and Naju) as an indispensable spring ritual: simmering fresh skate liver (*ae*) with the earliest tender green shoots of winter barley (*borisun*) in an earthenware pot of doenjang broth, known locally as *Hongeoaetguk*.
- As winter faded, agrarian communities suffering from seasonal vitamin deficiencies and lethargy (*chungonjeung*) turned to this dense, nutrient-packed stew; the combination of rich liver lipids and emerald barley shoots provided an immediate infusion of restorative vitamins and stamina to fuel the spring plowing season.

3. The Feast Mandate: Ceremonial Heritage and the Drama of Thermal Vaporization

- Preserving the time-honored southern cultural adage that *"a banquet without skate is no banquet at all,"* signifying that no wedding, celebratory feast, or ancestral memorial rite in Jeolla-do is complete without skate on the table.
- While chilled, fermented skate sashimi (*hongeo-hoe*) is celebrated for its chewy bite, heating the fish in soup dynamically accelerates the vaporization of ammonia gases, delivering a piquant, sinus-clearing sensation several times more intense than raw preparations—reigning as an iconic, high-end regional rite of passage and a proud monument of Korean fermentation gastronomy.

The Torrential Volatilization of Caustic Ammonia Vapors, the Velvety Foie-Gras Lipid Emulsion of Skate Liver, and the Cartilaginous Crunch of Fermented Wings: A Refined Portrait of Hongeotang

Hongeotang (Spicy Fermented Skate and Skate Liver Stew) stands as the audacious, biologically astonishing, and transcendental summit of Korea's marine bio-fermented (*tangban*) gastronomy. Sovereign skates (*Beringraja pulchra*), harvested from the cold, turbulent depths of Heuksan Island, are buried in rice straw within traditional earthenware onggi jars, undergoing prolonged anaerobic microbial aging. The resulting skate wings, rich in structural cartilage, are combined with the precious skate liver (*hong-eo-ae*)—revered along the southwestern coastline as the maritime equivalent of fresh foie gras—and arranged in a boiling vessel. Submerged in a clean rice-washing water stock seasoned with artisanal fermented soybean paste (*doenjang*), chili flakes, radish, bean sprouts, and scallions, the stew is subjected to roaring convective heat before being mounded high with crisp spring barley sprouts or wild water parsley

(*minari*). Daringly transporting cold raw fermented skate into the aggressive thermal kinetics of a 100°C rolling boil, this dish converts what evolutionary biology deems aversive ammonia into an exhilarating, therapeutic masterpiece of sensory balance.

Confronting the steaming, terracotta-tinted broth as it erupts with volcanic foam releases an immediate, electrifying olfactory shock: a concentrated cloud of thermal ammonia vapor surges from the broth, cutting through the sinuses like a bolt of cold lightning before resolving into the deep, bready perfume of aged soybean paste, earthy alliums, and the brisk pine-like fragrance of fresh water parsley. The first sip delivers an exhilarating, carbonated sensation across the oral mucosa; free ammonia ions stimulate trigeminal receptors with a frosty tingle, swiftly followed by a surging wave of thermal heat that courses down the esophagus, loosening tight chest muscles and unlocking deep, restorative perspiration. Sinking your teeth into a piece of skate liver delivers an unctuous revelation: the rich organ dissolves across the tongue like warm velvet butter, coating the palate in an opulent, omega-3 lipid film. In dramatic contrast, the thin cartilage rays running through the wing meat yield with a lively, auditory micro-crunch (*odok*), discharging captured marine minerals and savory gelatin without fibrous resistance. The rustic glutamates of fermented soybean paste soften the caustic edges of the volatile bases, while the aquatic snap of fresh herbs frames the finish, leaving behind a crystalline, breath-opening clarity that elevates this soup into an unforgettable rite of gastronomic transcendence.

The enduring majesty of Hongeotang lies in its historical roots along the southwestern waterways—born during the late Goryeo Dynasty when the coastal inhabitants of Heuksan Island fled inland up the Yeongsan River to escape pirate raids. During the long boat voyage to the inland port of Yeongsanpo in Naju, un-gutted skates stored in the hull fermented naturally rather than spoiling, unlocking an entirely new realm of flavor and medicinal efficacy. Documented in Jeong Yak-jeon's 19th-century marine treatise *Jasan Eobo* as an elite remedy capable of "curing abdominal distension and dispelling alcohol toxicity," Hongeotang stands as an irreplaceable monument of coastal resilience, metabolic detoxification, and the courageous genius of Korean fermentation craftsmanship.

Editor's Review

1. A Dynamic Harmony of Silken Skate Liver Dissolution, Cartilaginous Micro-Fractures, and Crisp Botanical Turgor

The textural landscape inside the bowl delivers an extraordinary, high-contrast interplay between lipid-dense visceral organs, connective tissue cartilage, and crisp botanical fibers. The skate liver melts into a delicate, fluid-like emulsion that provides a luxurious oral cushion. This velvety softness is dynamically interrupted by the wing cartilage, which, softened by sustained simmering, yields to tooth pressure with a clean, auditory snap that imparts remarkable structural friction without tough bone hazard. Simultaneously, fresh water parsley and bean sprouts maintain cellular turgor amid the thermal currents, supplying a refreshing vegetable snap that cleanses lingering fats and ensures an impeccably balanced, non-fatiguing mouthfeel from the first steaming ladle to the last.

2. Elasmobranch Urea-Urease Hydrolysis, High-Temperature (100°C) Ammonia (NH_3) Vapor Kinetics and TRPA1 Activation, Liver PUFA O/W Emulsification, and Doenjang Acid-Base Buffering

Hongeotang represents an exacting study in elasmobranch osmotic biochemistry, gas phase thermodynamics, and sensory neurophysiology. Unlike teleost fish, marine skates maintain blood and tissue isotonicity with seawater by accumulating dense concentrations of urea and trimethylamine oxide (TMAO). During traditional aging, endogenous and bacterial urease enzymes hydrolyze non-protein nitrogenous urea into ammonium carbonate salts. When subjected to the kinetic energy of a 100°C rolling boil, the chemical equilibrium shifts violently, elevating the vapor pressure of free ammonia gas (NH_3). These thermal volatiles forcefully ignite mucosal TRPA1 cation channels and olfactory pathways, producing an intense, eye-watering sensation of icy pungency. Concurrently, the skate liver—constituted of more than 40–50% polyunsaturated fatty acids (EPA, DHA)—is sheared by convective bubbling into a micro-scale oil-in-water (O/W) emulsion stabilized by soluble proteins, imparting the broth's characteristic milky body. The free glutamic acid and organic acids concentrated within aged fermented soybean paste (*doenjang*) perform an essential acid-base neutralization, protonating caustic free ammonia into mild, savory ammonium complexes, while the volatile monoterpenes of water parsley sequester trace fishy amines to establish a brilliant, harmonious equilibrium.

3. The Yeongsanpo Waterway Terroir and the Sovereign Zenith of Korean Bio-Fermented Marine Gastronomy

Transforming what common culinary intuition regards as the threshold of spoilage into an elite, life-affirming restorative tonic, Hongeotang represents the absolute apex of Korean controlled fermentation. By utilizing heat not to suppress pungent volatiles, but to liberate them into an invigorating, therapeutic bath of thermal energy, this iconic classic stands as an enduring sanctuary of domestic ingenuity, ecological mastery, and the boundless horizons of Korean culinary craftsmanship.



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